

## ABSTRACT

Wood cellulose is treated with a reactive silicate. The reaction is done to cellulose within the wood and may be catalyzed with acid or base catalysts or a carbon silicon halogen combination which produces in situ acid catalysts or a different combination to produce an in situ base catalyst which replaces some of the molecules or atoms within the cellulose structure with silicon, boron or other hydrophobic or anti-degrading agents. Preferably an organic solvent, such as alcohol is used to accelerate the reaction with the water in the wood. Here, the hydroxyl (OH) group on some or all of the cellulose molecules is partially replaced with silicon or an alternative atom or molecule to changes the character of the wood. The process may be modified to insert a preliminary step of adding a reactive agent to be locked into the wood. Manufacturing techniques to enhance the process using ultrasound or other wave generating techniques are also taught.